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A tree sets the stage as a recognizable part of the course, and be a point of pride for players.

While trees can give a course its signature edge and draw attention and pride from players, unmaintained they can become a bane to golf course superintendents, causing pruning and shade challenges that can impact playability and budget.

“Superintendents are turf experts; they are always looking down at the green, and trees become an obstacle in their quest to grow perfect, playable turf,” explains Michael Bova, a project coordinator with the Davey Resource Group and an International Society of Arboriculture Certified Arborist

and Certified Tree Risk Assessor, based on the West Coast.

Because turf is king on the course, trees tend to take a backseat. “And when tree care is deferred for too long and it starts to show, members complain, pride of the course decreases and maintenance costs increase,” Bova says. “It’s a vicious circle.”

But in today’s age of heightened sustainability concerns and economic challenges, properly caring for course trees in a proactive fashion means the difference in course aesthetics and maintaining a tight budget.

**THINK LIKE AN URBAN FORESTER.** Liability is a superintendent’s biggest concern when maintaining large trees on a golf course. But reacting to major issues when they occur, such as lightning strikes or turfgrass performance issues – or what Thomas Schlick calls “knee-jerk reactions to tree care” – can be very expensive.

“You wouldn’t plant a tree in the end zone of a football field or the back of a soccer pitch and then wait for problems to ensue, dipping into your emergency funds to deal with them, so why would you do this on a golf course?” says Schlick, Southern division manager of Davey Golf Course Maintenance and a certified golf course superintendent. “Even the best architects can’t envision what trees are going to do 50 years after they are planted.”

Conflicts arise when superintendents who are excellent at growing turf sometimes lack the knowledge necessary for maintaining a healthy forest. So what tends to happen is a violation of standard urban forestry practices, resulting in wasted resources, money and

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decreasing the benefits the course provides to members and the community.

To properly care for the trees on their courses, superintendents must think more like urban foresters, Bova advises. Being proactive vs. reactive can not only keep planning time and maintenance costs in check, but can also enhance the golf course's standing in the community. The course as a mini forest, maintained properly, provides essential benefits to the surrounding area, including boosted property values and energy savings, carbon sequestration, improved air quality, reduced stormwater runoff and enhanced cooling.

**FOLLOW TREE CARE STANDARDS.** Today, most dollars spent on trees in golf course maintenance are dedicated to those that are in the field of play. Trees on the fringe or property perimeter get less attention than others, Schlick says. As a result, liability increases and sustainability decreases because forest health and overall benefits decline.

A golf course tree maintenance program should focus on all course trees and should center around what Bova calls the three Ps – planting, placement and pruning.

**Planting.** When planting or transplanting trees, superintendents need to ensure they are the proper species for the course, which means they have minimal leaf litter, are low maintenance and provide the values they seek. Just because one species is removed doesn't necessarily mean it should be replaced with the same species, Bova says. A major problem with many courses across the country today is tree monoculture.

A mixed age class is also important for golf course trees. Ideally, 15 to 40 percent of an urban forest should be made up of young trees 12 inches or smaller in diameter, 25 to 30 percent of a forest should be made up of mature trees between 12 and 30 inches in diameter and the remaining 5 to 10 percent of a forest should comprise trees more than 30 inches in diameter, Bova says.


"A sustainable urban forest requires spe-

cies and age diversity," he says. A golf course should have no more than 10 percent of any one species and 20 percent of any one genus.

A balanced mix of tree species and age placed properly can better handle severe weather events, insects and diseases and be more naturally low maintenance, providing sustainability and budget goals. Creating a monoculture could be a huge liability issue if, for instance, an invasive pest or destructive disease enters the forest. This was unfortunately the case with the Winged Foot American elm, and those trees are now on a preventive, proactive program to ensure their safety and long life, says Mike Cook, an ISA Certified Arborist with The Care of Trees, who takes care of trees on more than 15 golf courses in the Northeast, including Winged Foot.

**Placement.** Strategic tree location in the long-term will provide room for growth that is consistent with the course strategy and play challenge.

"It's not just about filling a hole," Bova says.



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Not only does a tree's species factor into whether or not it will survive on a course, even its placement on the course comes into play. The Oaks Club, Osprey Fla.

"It's about putting the right species in the right location to grow to a mature size without impacting other trees or reducing the playability on the course."

**Pruning.** Proper pruning is the ultimate key to having course trees continue to provide positive playability challenges and aesthetic benefits, as well as reducing maintenance costs. Many times, superintendents thin trees annually to ensure turf receives adequate light, which can be around six to eight hours for bentgrass, Cook says. But overpruning forces the tree to push out growth and develop weak branch attachments, increasing pruning needs to continue to ensure turf receives light and, as a result, driving up maintenance costs. Trees placed in locations that match their health needs should be able to hold for three years between prunings. "Any more and the tree is basically telling you it's the wrong species for that location or planted in the wrong place," Bova says. "On top of that, excessive pruning is not a sustainable practice because it shortens trees' lifespans, decreases the benefits they provide and increases your costs."

Irrigation is another key factor concerning trees on golf courses. Because courses are being irrigated in most cases for turf, trees are not receiving proper hydration. They develop excess surface roots, which create additional conflict when roots damage mowing equip-

## HIGH-TECH TREE TRACKING

An excellent way to manage trees on a course is by conducting a tree inventory with the help of global positioning system technology.

"This is incredibly beneficial as it helps you better manage your trees, providing you with species statistics, approximate age and a rough assessment of other characteristics you can start to track," Schlick says.

This level of planning can also help superintendents when handling difficult situations with members or greens committees – for instance, an uproar over a tree removal or a member's insistence on planting a memorial tree in a poor location on the course.

A golf course superintendent's ultimate goal should be to create a long-term tree plan and budget for annual tree care, keeping tree pruning on a three- to five-year rotation so each year a new set of trees is trimmed. "With a better plan, superintendents can better educate their members so when trees are removed they can show there are valid reasons," Bova says. "With a plan, superintendents can also express their desire to plant trees and maintain a healthy, sustainable forest that benefits them, their members and the community around them."



TOP LEFT: COURTESY OF THE OAKS CLUB, OSPREY FLA. TOP RIGHT AND RIGHT: COURTESY OF DAVEY TREE



Tree root systems should run deep, so the tree can sustain itself on rainwater rather than irrigation. The Westchester Country Club in N.Y., a white oak at the left side of #11 south green.



ment and prevent optimum turf growth. Trees also don't benefit from fertilizer used for turf on a course.

Some trees, such as pines used on golf courses in the Southeast, do not thrive in these excess moisture environments. "So when they border a fairway where turf gets heavily irrigated, they tend to turn yellow or show other signs of stress and are more susceptible to borer infestation," Schlick says.

"What we're seeing now is more golf courses expanding tree rings and putting mulch down so they don't have as much of a tree-turf conflict and still have a somewhat playable surface," Bova says.

As golf courses are pressured to become more sustainable, they are also removing turf areas in exterior roughs and turning them into native habitats to reduce water use and maintenance costs. While creating these ecological areas is positive, it can be detrimental to trees. "While trees don't use a lot of water, they are typically accustomed to surface watering via turf and therefore have developed surface roots," Bova says. "To protect these trees, instead of just shutting down irrigation, provide trees with some drip irrigation so they can establish a deeper root system and then be weaned off so they can sustain themselves on rainwater. Trees aren't big water users but they have to be considered when reducing water use. Losing a 50-foot oak is a lot more costly than removing a few square feet of turf." **GCI**

*Nicole Wisniewski is a senior project manager with The Davey Tree Expert Company, Kent, Ohio. She can be reached at [nicole.wisniewski@davey.com](mailto:nicole.wisniewski@davey.com).*



A tree should only need pruning once every three years – more frequent pruning will make the tree push out new growth faster. Hole 11 at the Mesa Verde Country Club in Costa Mesa, Calif.





**Brian Vinchesi**, the 2009 EPA WaterSense Irrigation Partner of the Year, is president of Irrigation Consulting Inc., a golf course irrigation design and consulting firm headquartered in Pepperell, Mass., that designs irrigation systems throughout the world. He can be reached at [bvinchesi@irrigationconsulting.com](mailto:bvinchesi@irrigationconsulting.com) or 978/433-8972.

## A NIGHT OUT

It has been another tough year – too much rain, too little rain, hurricanes and scorching heat. You deserve a night out. But before you get too excited, I am suggesting you spend a night, all night to be exact, in your irrigation pump house. If you have never spent a night with your pump system, it can be an educational experience. Pack a cooler, bring a chair, take along a pad (paper or iPad) and you're ready.

So why spend a night in your pump house? To listen! To listen for how the pumps come on and go off. To listen to how the drive – if you have one – ramps up and down. To listen to how the pumps switch from one to two to three and how they go off. And if you hear something odd, to look at the pressure, the flow, the time and what pumps are operating.

There are more exciting things to do than sit in a pump house all night. And you could argue your monitoring software shows you everything going on and alerts you if there are issues. True, but you could be having issues that your flow meter, pressure transducer and monitoring software are not picking up because your pump system technology is not fast enough. Not convinced? Here are a few examples.

A New Jersey golf course with new irrigation and pump systems was having coverage issues. Dry spots were about five feet from the sprinklers and it was getting worse daily. The sprinkler manufacturer said they were having some nozzle issues so all of the nozzles were replaced. Two weeks later, there was no change in the coverage. When the system was operated, everything looked fine. Out of ideas and, frankly, excuses, the superintendent spent a night in the pump house. He quickly discovered the filter on his

pump system was backwashing many times an hour. Each time the pressure was dropping significantly. This was a definite cause of the poor coverage given the frequency of backwash. This was a surprise, as it did not show up on the monitoring software, nor was the system shutting down on the low-pressure shut off. Turns out the pressure transducer was incorrectly installed before the filter – not after, as it should have been. So the pump station control panel never saw the frequent low pressure. It never reacted or showed it on the monitoring software. Solution: move the transducer and change the filter screen mesh.

A New York golf course with two booster pump stations had an issue

half hour. On the last trip when everything shut off he heard something different: irrigation. However, it was not his irrigation; it was all the houses in the neighborhood. This was a high-end private course in an affluent neighborhood. All the houses had landscape irrigation systems and it seemed they were all scheduled to start at 2 a.m. The golf course was at the end of the road on the ocean. Basically, once the residential systems came on, the golf course was starved of water. The problem was found, but the solution was not easy or inexpensive to fix. Temporary fix: start and finish irrigation earlier.

A Las Vegas course purchased a new, larger pump station to operate its

If you have never spent a night with your pump system, it can be an **educational experience**.

with the stations shutting off on the low inlet pressure safety several nights a week. The problem never occurred during the day. So a night out was scheduled, but with the variety of going back and forth between two pump houses. Irrigation system start was 11 p.m. As well as listening, it was important to watch the flow and incoming pressures and document them. Things were fine until about 1:30 a.m. Then the city pressure started to drop from 50 psi to 30, then 20, then 15 psi. The system shut off at about 2:05 a.m. The superintendent had no idea why both pump systems shut down at almost exactly at the same time, even though on opposite ends of the course. Driving pump house to pump house required traversing some residential neighborhoods as the superintendent switched pump houses about every

existing irrigation system. Monitoring software picked up large changes in flow and pressure during the night. Conclusion: the new pump system is not reacting fast enough to changes in the irrigation system. So a night out is set to listen to the pump station. Schedule starts at 7 p.m. At 7:25 the pump station goes berserk. The course's irrigation tech informs the assembled masses the irrigation system shut off about half the sprinklers for about 10 seconds and then turned them on. This may not be a big deal for most courses, but in Las Vegas, half was about 60 sprinklers. No wonder the pump system had a fit. Turns out it is not a pump station issue but an irrigation issue. Their old pump station wasn't quick enough to pick up these demand fluctuations (paddle wheel vs. Mag meter) but the new one was. **GCI**





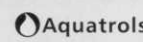

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# BATTLING



To combat snow mold resistance, superintendent Bill Stein investigates alternatives to his course's traditional treatment.

By Bill Stein

As the golf course superintendent at Minocqua Country Club in Minocqua, Wis., for the past three years, I prepare my course for the cold, snowy winter weather every year. Snow mold control is always a top concern for me as well as many other Wisconsin and across the northern Midwest superintendents. My first year in this region, I underestimated how much higher snow mold pressure is here as compared to North and South Dakota where I had worked.

Fortunately, when I started at Minocqua in the fall of 2008, the prior superintendent had already planned and purchased products for a snow mold program that I was able to apply. If I had been in charge of the program, I likely would have selected a lighter application which would not have produced such great results under extreme snow mold pressure. These past three years have been a learning experience in controlling such extreme snow mold.

That same fall, we sprayed a fungicide on our greens, tees and fairways as our last chemical application of the year to combat snow mold. The following spring, I learned just how vital it is to have perfect chemical coverage from fall applications. As the snow melted and the turf started to grow, we noticed only half of the turf had been treated on one of our tees; the untreated area was completely dead. In other parts of the course, we noticed that even the slightest

miss with the sprayer showed up in the spring.

Knowing we needed to eliminate the chance of skips and operator error, we decided to try splitting our application. The next fall we sprayed half of the application and then waited to spray the remainder of the application as close to the first snowfall as possible. We figured this method would guarantee at least 50 percent coverage if there were equipment or operator errors. Even though this meant we had to spray twice, this technique makes sense and works effectively since snow mold control is so vital for my course.

For many years the course had successfully used one particular product to control snow mold. However, due to my overall philosophy in chemical management, I am investigating different products. I believe if you use the same chemicals repetitively and do not vary the active ingredient, the snow mold can become resistant to the active ingredient and the product won't be as effective.

My search began last summer for an alternative product. I studied the snow mold control trials from the University of Wisconsin's turf research department to gain insight into the market. I turned to their site not only because of their reputation, but also because our current program was based on data from their trials years earlier.

After all my research, I decided to run an on-site trial with Bayer's

Interface and Triton FLO. I liked the results I saw from the trial and after looking at several different products, I met with my Bayer sales representative to begin the trial in October 2010. It was 45 degrees when I applied Interface at 6 oz./thousand acres and Triton Flo at .85 oz./thousand acres to a bentgrass fairway and rough. To ensure proper application and full coverage, I used an air induction nozzle that sprayed 60 gallons/acre.

This combination of Interface and Triton FLO provided the competitive snow mold control I was looking for, with absolutely no snow mold breakthrough. The control lasted throughout the spring, even though we faced a rather cool spring that could have increased snow mold issues. In Wisconsin, where it remains cold long into the spring season, it's important that the sun's heat is drawn to the soil for quicker turf green-up to open our courses on time.

The Bayer trial demonstrated the treated areas were not only snow mold-free, but also had more vibrant color than I'd seen on my other fairways. The turf showed quicker green-up. At this time, my decision to switch to Bayer's snow mold program is driven by continued success of the product in the field as well as the cost-effective price in the present economy. **GCI**

*The author is superintendent at Minocqua Country Club in Minocqua, Wis.*



Stein

# SNOW MOLD



BY JOHN C. STIER AND WAYNE R. KUSSOW

## Buffer Strips, Runoff, and Leachate

Research compares nutrient loading in runoff and leachate when buffer strips are used alongside golf course fairways.

Federal mandates to decrease nutrient pollution of water supplies are resulting in various local and state regulations aimed at reducing phosphorus (P) movement into surface waters and nitrogen movement into groundwater. Some regulations aim to reduce nutrient and sediment loading into surface waters based on the idea that “native” or prairie vegetation should be used as buffer strips between mowed turf and natural areas or surface water.

Some research indicates that dense turf vegetation is more effective at reducing runoff and nutrient leaching than other strategies, including mulched landscaped beds. Data are just starting to be published that report on the effectiveness of prairie buffer strips to reduce nutrient loading in water runoff and leachate relative to turf. Also unknown is the size requirement of buffer strips relative to the area they are to be buffering.



Some research indicates that dense turf vegetation is more effective at reducing runoff than other strategies.